

REMARKS

Claims 1-33 are pending in the application.

Claims 1-31 stand rejected.

Claims 1, 6, 14, 18, 20, 23, 25, and 30 have been amended. Support for these amendments can be found, at least, in paragraphs 27, 49, and 54 of the specification.

Claims 32 and 33 have been added. Support for these claims can be found, at least, on pages 8-10 of the specification.

Rejection of Claims under 35 U.S.C. §103

Claims 1-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Coulter, et al., U.S. Patent Publication No. 2004/0243775 (Coulter). Applicants respectfully traverse this rejection.

With respect to amended claim 1, the cited art fails to teach or suggest:

“generating a block-level write operation, wherein the block-level write operation causes a value to be written to a region of a primary volume;
identifying whether the region of the primary volume stores a first type of a plurality of types of file system metadata; and
generating information indicative of whether any of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume, wherein if the region of the primary volume stores the first type of file system metadata, the information identifies that less than all of the block-level write operation should be transferred to the secondary site.”

In Coulter’s system, a “storage controller maintains internal information referred to as metadata, which describes which data blocks have moved from the primary volume to the secondary volume in response to data writes on the primary volume and also describes where the data resides on the secondary volume. In response to a snapshot command (other than the initial snapshot command), the storage controller initiates a transfer or copy operation of those blocks which have been written on the primary volume between the previous snapshot instance and the current snapshot instance.” Coulter, p. 1, paragraph 15.

Accordingly, Coulter describes a system that tracks blocks that have been moved from primary to secondary in response to writes on the primary and, when a snapshot command is received, copies those blocks which have been written on the primary since the last snapshot instance to a backup. Coulter does not disclose or suggest “identifying whether the region of the primary volume stores a first type of a plurality of types of file system metadata,” as recited in amended claim 1. Coulter also does not disclose or suggest “generating information indicative of whether any of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume, wherein if the region of the primary volume stores the first type of file system metadata, the information identifies that less than all of the block-level write operation should be transferred to the secondary site.” For at least these reasons, amended claim 1 is patentable over the cited art. Claims 2-12, 18-20, 23-25, 30, and newly added claims 32-33 are patentable over the cited art for similar reasons.

With respect to claim 12, the cited art fails to teach or suggest receiving a block-level write operation to a primary volume and associated information, and in response to the associated information, determining that less than all of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume.

As noted above, in Coulter’s system, write operations are tracked. Whenever a snapshot command is received, incremental backups are created by copying the blocks that have been overwritten since the previous snapshot command (e.g., see paragraphs 11-12). “To facilitate conducting incremental backups, metadata describing the block-level operations is stored in a buffer and referenced to determine which data blocks should be transferred to the backup device.” Coulter, para. 12.

Thus, in Coulter’s system, metadata is referenced to determine which blocks have been overwritten during a given time period. The blocks identified by the metadata are then copied to a backup. Coulter does not teach receiving both a write operation and associated information, and determining whether to transfer less than all of the write operation in response to the associated information. Instead, Coulter simply teaches referencing metadata to determine whether to transfer the value of a particular block. Claim 12 is patentable over the cited art for at

least the foregoing reasons. Claims 13-17, 21-22, 26-29, and 31 are patentable over the cited art for similar reasons.

Claims 1-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Midgley, et al., U.S. Patent Publication No. 2003/0074378 (Midgley). Applicants respectfully traverse this rejection.

With respect to amended claim 1, the cited art fails to teach or suggest:

“generating a block-level write operation, wherein the block-level write operation causes a value to be written to a region of a primary volume;
identifying whether the region of the primary volume stores a first type of a plurality of types of metadata; and
generating information indicative of whether any of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume, wherein if the region of the primary volume stores the first type of metadata, the information identifies that less than all of the block-level write operation should be transferred to the secondary site.”

Midgley describes a system that provides continuous backup of data. In Midgley, agents monitor the source data files to detect and capture changes to the source data files. These changes are recorded in journal files, and the journal files are copied to the back up server so that the captured changes can be written to the target files. Midgley, Abstract.

Midgley does not disclose or suggest “identifying whether the region of the primary volume stores a first type of a plurality of types of file system metadata,” as recited in amended claim 1. Similarly, Midgley also does not disclose or suggest “generating information indicative of whether any of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume, wherein if the region of the primary volume stores the first type of file system metadata, the information identifies that less than all of the block-level write operation should be transferred to the secondary site.” Amended claim 1 is patentable over the cited art for at least the foregoing reasons. Claims 2-12, 18-20, 23-25, 30, and newly added 32-33 are patentable over the cited art for similar reasons.

With respect to claim 12, the cited art fails to teach or suggest receiving a block-level write operation to a primary volume and associated information, and in response to the associated information, determining that less than all of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume.

As noted above, Midgley describes a system for recording changes to files in journal files, and then transferring the journal files to the backup server. Based on the journal files, the backup server can apply the changes to the files on the backup. Midgley, Abstract and paragraph 58. Midgley describes various agents for generating the journal files in paragraphs 59 and 61-63. As described in these paragraphs, these agents sit above the file system and intercept write requests being sent to the file system. The journals themselves identify the files that have been modified (e.g., see Midgley, paragraph 66). Thus, the journals are created based on write operations that occur at the file system level. Furthermore, the journals include information about file-system-level operations (i.e., journals identify changes by identifying the respective files that have been changed).

Accordingly, Midgley tracks write operations at the file system level, not at the block level. Thus, Midgley does not teach or suggest receiving a block-level write operation to a primary volume and associated information, and in response to the associated information, determining that less than all of the block-level write operation should be transferred to a secondary site during replication of data in the primary volume, as recited in claim 12. Claim 12 is patentable over the cited art for at least the foregoing reasons. Claims 13-17, 21-22, 26-29, and 31 are patentable over the cited art for similar reasons.

Additionally, Applicants note that, under 37 C.F.R. §1.104(c)(2), “The examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable.” The Office Action cites nearly the entire detailed description (paragraphs 28-52) of Coulter in the rejection. Office Action, p. 2. Similarly, the Office Action cites pages 4-12 of Midgley in the rejection of claim 1. Applicants respectfully request that the Examiner more clearly point out which portions of Coulter and Midgley are being relied upon in the rejections of claim 1.

CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5087.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on November 4, 2005.

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Date of Signature

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